



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,576	02/06/2006	Piotr Szwaykowski	TROLOGY 02.02	9931
27667 7590 10/02/2009 HAYES SOLOWAY P.C. 3450 E. SUNRISE DRIVE, SUITE 140 TUCSON, AZ 85718				
EXAMINER LEE, HWA S				
ART UNIT 2886		PAPER NUMBER		
NOTIFICATION DATE 10/02/2009		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

admin@hayes-soloway.com
smckniff@hayes-soloway.com
nsoloway@hayes-soloway.com

Office Action Summary

Application No.

10/536,576

Applicant(s)

SZWAYKOWSKI ET AL.

Examiner

Hwa S. Lee (Andrew)

Art Unit

2886

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3-33 and 35-41 is/are pending in the application.
- 4a) Of the above claim(s) 36-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-35, 40 and 41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

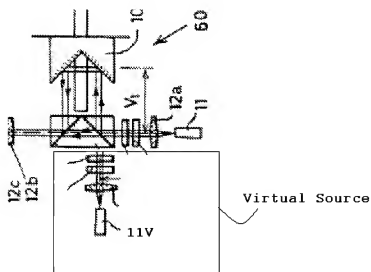
2. Claims 1, 3-11, 13, 14, 16-21, 26-33, 35, 40 and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuchel (US 4,872,755).

Kuchel show an interferometer for measuring optical phase differences (e.g. Figure 6) comprising

a source module (60) configured to generate mutually orthogonally polarized beams of light from spatially separated sources (please see diagram below showing how there is a source (11) and a virtual source (11V) created by the beamsplitter. The source (11) and virtual source (11V) are spatially separated);

an interferometry module (13-16) receiving said mutually orthogonally polarized beams from said source module, and having at least a reference object (14) and a test object (16) for interaction with said beams; and

a simultaneous phase shifting module (68) receiving a portion of said beams from said interferometry module for generating at least two phase-shifted (67b) interferograms substantially simultaneously from said beams.



In addition, the functional recitations following “configured to...” do not have patentable weight because they are narrative in form. In order to be given patentable weight without reciting supporting structure, the function recitation must be expressed as a “means for” performing the specified function, as set forth in 35 U.S.C. 112, 6th paragraph, and must be supported by specification of sufficient structure to warrant the presence of the functional language. In re Fuller, 1929 C.C. 172; 388 O.G. 279.

The functional recitations in the claims (e.g. “configured to” or “adapted to”) do not patentably distinguish if the function is not supported by sufficient structure to distinguish from the structure of the prior art. If the prior art shows the same claimed structure (e.g. “a source module,” the prior art is capable of performing the function (e.g. “to generate mutually orthogonally polarized beams of light from spatially separated sources.”) If the prior art shows

the same claimed structure, but is incapable of performing the function, then the claim does not recite sufficient structure to support the functional recitation.

In addition, M.P.E.P. 2114 [R-1] states:

2114 [R-1] Apparatus and Article Claims - Functional Language

**APPARATUS CLAIMS MUST BE STRUCTURALLY DISTINGUISHABLE FROM
THE PRIOR ART**

While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

With respect to claims 3 and 4, see polarizing beamsplitter (60a) that produces the orthogonal test and reference beams that are spatially separated.

With respect to claim 5, the reference and test beams received by said simultaneous phase shifting module substantially overlap each other.

With respect to claim 6, the laser (11) produces the mutually orthogonally polarized beams that are coherent.

With respect to claim 7, the beamsplitter (60a) splits the beam from laser (11) to produce two spatially separated sources.

With respect to claims 8 and 18, beamsplitter 12d is an alignment module positioned to intercept the beams between the interferometry module and the simultaneous phase-shifting module.

With respect to claim 9, 17b, 67a, and 18a-d are imaging modules.

With respect to claims 10, 20, and 21, the source module includes a linearly polarized light source (11) and a polarization beamsplitter (60a) configured to split linearly polarized light into said two mutually orthogonally polarized beams, wherein said polarization beamsplitter comprises a prism.

With respect to claim 11, the sources are virtual.

With respect to claims 13 and 14, the interferometry module further includes a nonpolarizing beamsplitter (12d) wherein the nonpolarizing beamsplitter is positioned substantially between the source module (60) and the reference object (14).

With respect to claim 17, the interferometry module is of a Fizeau configuration.

With respect to claim 19, Kuchel shows an imaging module (17b, 67a) is positioned to intercept the beams between the interferometry module and the simultaneous phase shifting module.

With respect to claim 26, polarization beamsplitter (6) comprises a beamsplitter (60a) which are made of two virtual cube beamsplitters and further comprises a mirror (10b).

With respect to claims 27 and 28, Kuchel shows an aperture filter (17a) to block said other portion of the beams from entering the simultaneous phase shifting module.

With respect to claim 29, Kuchel shows:

a source module (60) having a source (11) of polarized light and a polarization beamsplitter (60a) configured to act on said polarized light to generate mutually orthogonally polarized beams of light;

an interferometry module (13-16) receiving said orthogonally polarized beams from said source, having optical elements (12d, 13), a reference object (14) and a test object (16), said interferometry module further comprising means for overlapping (13) a test beam and a reference beam;

a phase shifting module (68) receiving a portion of said beams from said interferometry module to generate at least two phase-shifted (67b) interferograms substantially simultaneously from said test and reference beams.

With respect to claim 30, the polarized light from said source module is linearly polarized.

With respect to claim 31, elements (18a-d) are means for viewing said test and reference beams.

With respect to claim 32, polarizing beamsplitter (68b or 68c) is a means for selecting said test and reference beams.

With respect to claim 33, Kuchel shows:

a source module (60) having a source (11) of linearly polarized light, and a polarization beamsplitter (60a) configured to generate mutually orthogonally polarized wavefronts as emanating from two spatially separated sources;

an interferometry module (12b-16) receiving said orthogonally polarized wavefronts, said interferometry module having a test object (16) and a reference (14), a beam splitter (12d) and a collimator (13), wherein orthogonally polarized reference wavefronts and orthogonally polarized test wavefronts exit the interferometry module; means for overlapping (17) one of said orthogonally polarized reference wavefront with one of said orthogonally polarized test wavefronts;

a simultaneous phase shifting module (68) receiving said overlapping one reference wavefront and said one test wavefront from said interferometry module for generating at least two phase-shifted (67b) interferograms substantially simultaneously.

With respect to claim 35, delay (10b, 10m, 10r) is a variable phase retarder.

With respect to claim 40, the beams follow a substantially common path through the interferometric system.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 12, 15, 16, and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchel as applied to their respective independent claim or as applied to claims 1 and 33 above.

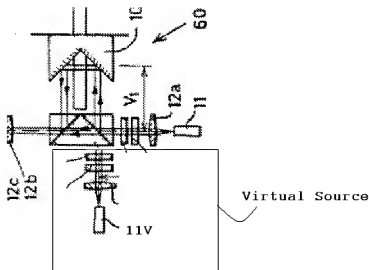
With respect to claim 12, Kuchel does not show the sources being real; however it is well known in the art that there are several ways to make orthogonally polarized beams, including the use of two separate real sources. At the time of the invention, one of ordinary skill in the art would have used two real sources in order to produce beams of high intensity. By using two real sources, the beams have more intensity than the use of a single source where the beam is split in intensity to produce the two beams.

With respect to claims 15, 16, and 34, Kuchel shows the quarter wave plate located in the source, and not positioned between the source module and the reference object, however the relocation of a working part only requires routine skill in the art.

With respect to claims 22-25, Official Notice is taken that the different forms of polarizing beamsplitters are well known in the art and are functional equivalents. At the time of the invention, a skilled artisan would have used calcite for its quality optical properties, would have used a cube splitter for low cost, and would have used optical fibers for flexibility.

Response to Arguments

5. Applicant argues that Kuchel does not show that the mutually orthogonally polarized beams are not generated from spatially separate sources. The examiner respectfully disagrees. Kuchel may not expressly state the mutually orthogonally polarized beams are not generated from spatially separate sources; however the beamsplitter (60a) splits the beam from source (11). Please see the diagram below. One of the split beams transmits through the beamsplitter (60a) to element 12c. The transmitted beam has a source as the real source (11). The other of the split beams is reflected by the reflective surface of the beamsplitter (60a) and sent to element (1C). This reflected beam has a source which is virtual (11V) which is located perpendicular to the real source (11). Therefore, the examiner submits the real source (11) and the virtual source (11V) are spatially separated.



Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Smith (US 3,958,884) shows the production of mutually orthogonally polarized beams by spatially separated virtual and real sources.
- b. Knüttel (US 5,491,552) shows a virtual source created by an acoustic optic modulator and a beamsplitter.
- c. Shirley (US 6,690,474) shows a beamsplitter that produces two beams, each beam from a virtual source (Figure 2, 2a).
- d. Shirley (US 6,341,015) shows the production of mutually orthogonally polarized beams by spatially separated virtual sources.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hwa S. Lee (Andrew) whose telephone number is 571-272-2419. The examiner can normally be reached on Monday, Tuesday, Thursday, and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur R. Chowdhury can be reached on 571-272-2800. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Hwa S. Lee (Andrew)/
Primary Examiner, Art Unit 2886